AFRL technology helps catch a killer

When Poughkeepsie police faced the daunting task of sifting through thousands of electronic evidence documents to solve a crime, they turned to technology developed at the Air Force Research Laboratory's Information Directorate in Rome, NY, for help.

The case in question involved the murder of a local woman. There was evidence to suggest that it was a murder-for-hire situation, but nearly all of the hard evidence was electronic. It was buried in thousands of cell phone calls, pager communications, and e-mail correspondence.

According to New York State Police Senior Investigator Tom Martin, the mountain of electronic evidence was key to discovering the relationships among the parties involved, and to establishing the role of the mastermind. The problem would be in sorting through the stacks of information to find the connections.

Martin recognized the need for assistance, and contacted the National Law Enforcement and Corrections Technology Center (NLECTC)–Northeast, and its Law Enforcement Analysis Facility (LEAF). He hoped to take advantage of NLECTC's expertise in analyzing audio, video, and electronic evidence.

"Our job was to input all those communications into a computer and analyze it," said James Hepler, a law enforcement analyst for LEAF. "There were 4,000 [records], all in paper form and on different types of paper. We had to enter them all by hand. It took us six weeks."

The Web Enabled Timeline Analysis System (WebTAS) made the analysis of the data possible. Develop by AFRL's Information Directorate, WebTAS sorted and analyzed each document to show relevant connections and relationships. One benefit of WebTAS is that it can be queried on specific types of relationships. For example, you can tell the computer to show you all calls between two individuals from a certain date, location, and duration.

"WebTAS graphically plots criminal events and presents visual and statistical data on timelines, graphs, tables, and maps," said Hepler. "The timeline developed for this case showed links among those involved. This kind of tool helps the jury visualize the relationships."

Additionally, maps were created with data from an electronic toll road access card that allowed investigators to determine where certain phone calls were made.

In the end, LEAF provided Martin and the Dutchess County Assistant District Attorney with 16 timeline slides. The slides enabled the investigators to better understand the links, and helped the jury visualize the relationships among the people involved.

With the help from WebTAS, both individuals involved in the murder were convicted.

"I think it was the crux of the whole prosecution," said Martin. "My experience is that today's science is so advanced. It's one step of the process to produce evidence; it's another step to get someone to understand it. The work LEAF [and WebTAS] did allowed us to present something that helped people understand."

The usefulness of WebTAS does not stop with the simple analysis of information. The program can also be used as a predictor of behavior or events. By using an algorithm called the Temporal Transition Model, analysts take information about a suspect's behavior and use it to predict what the suspect might do next. This technique can be used to show commonalities across data in cases of organized or financial crime, drug offenders, or serial killers.

The LEAF team is currently testing WebTAS capabilities in a pilot project at the Syracuse Police Department and the Connecticut State Forensic Science Laboratory. Investigators will use the software to analyze cold cases and to help set up surveillance.

For more information on WebTAS, contact Hepler at jhepler@acsdefense.com.

This story was compiled using information from a story that appeared in the Natoinal Law Enforcement and Corrections Technology Center, TECHbeat, Spring 2002 edition.